Docket No.: 2729-0117PUS1
(Patent)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:	Kazuto NAGATA et al.		
Application No.:	10/590,727	Confirmation No.:	2537
Filed:	August 25, 2006	Art Unit:	1621
For:	POLYACENE COMPOUND AND ORGANIC SEMICONDUCTOR THIN FILM	Examiner:	KATAKAM, S.

DECLARATION UNDER 37 C.F.R. § 1.132

MS AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Kazuto Nagata, hereby declare as follows:

I am one of the co-inventors of the invention as described and claimed in the above-identified patent application.

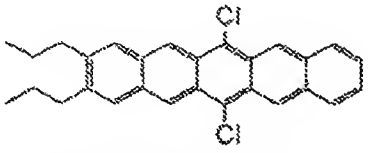
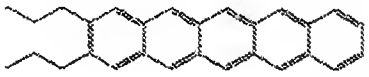
The following examples have been carried out by me or under my direct supervision in order to verify the effect on oxidation resistance by introducing the halogen group. Test procedures and results are shown below.

An oxidation resistance of the 6,13-dichloro-2,3-di(n-plopyl) pentacene recited in claim 1 of the present application and an oxidation resistance of the 2,3-di(n-plopyl) pentacene without substituting the halogen group, as a comparison example, were examined.

Method of Examination

The orthodichlorobenzene-d_4 (0.13 wt%) solution of the 6,13-dichloro-2,3-di(n-plopyl) pentacene and the orthodichlorobenzene-d_4 (0.13 wt%) solution of the 2,3-di(n-plopyl) pentacene were prepared in an NMR tube at normal atmosphere, and both of them were heated for two hours at a temperature of 80°C by an oil-bath. The decomposed amount of both cases of the pentacene were verified for a solution immediately after the solution was prepared and for a solution after the solution was heated, by measuring the ^1H NMR spectrum.

Results

	Embodiment	Comparative Example
Chemical Compound	 6,13-dichloro-2,3-di(n-plopyl) pentacene	 2,3-di(n-plopyl) pentacene
Decomposition Rate (^1H NMR)	Less than 15%	100%

The decomposed rate of the 6,13-dichloro-2,3-di(n-plopyl) pentacene was about 10% after two hours of heating compared with immediately after the solution was prepared. The main decomposed compound was 2,3-di(n-plopyl)-6,13-pentacene quinone which is the oxidation-product (see FIGS. 1, 2, and 5 below). On the other hand, the 2,3-di(n-plopyl) pentacene was completely decomposed after two hours of heating, and the main product of the decomposed compound is also 2,3-di(n-plopyl)-6,13-pentacene quinone (see FIGS. 3, 4, and 6 below). This examination result strongly indicates an improving effect of the oxidation resistance by introducing the halogen group (Cl atoms).

Figure 1

The ^{1}H NMR spectrum of the 6,13-dichloro-2,3-di(n-plopyl) pentacene immediately after the solution was prepared.

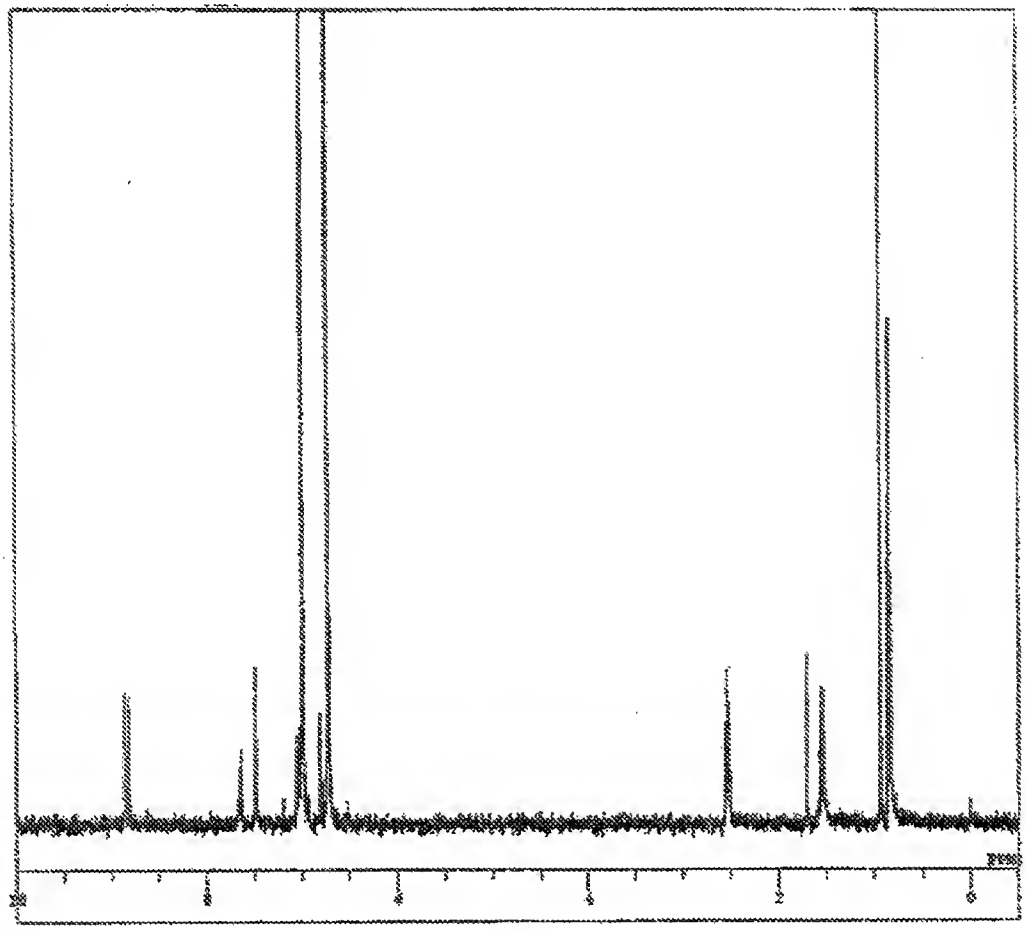


Figure 2

The ^1H NMR spectrum of the 6,13-dichloro-2,3-di(n-plopyl) pentacene after the solution was heated for two hours.

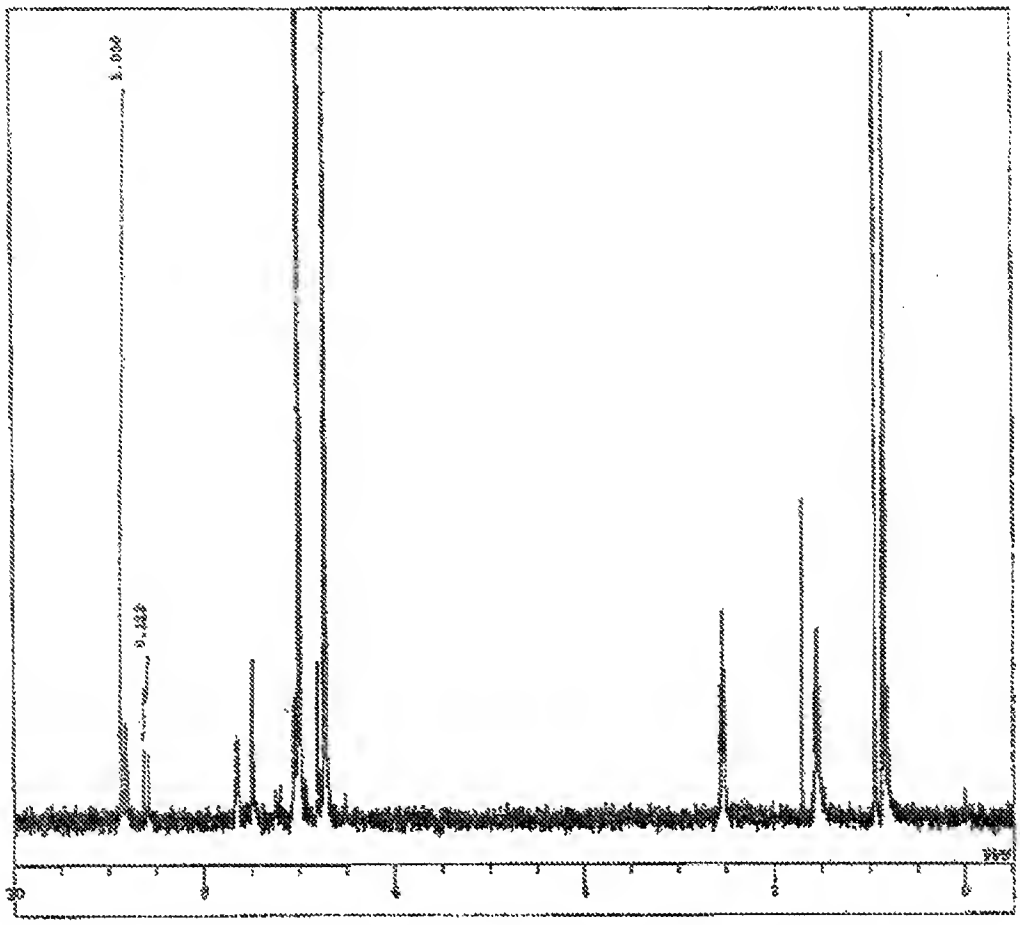


Figure 3

The ^{1}H NMR spectrum of the 2,3-di(n-plopyl) pentacene immediately after the solution was prepared.

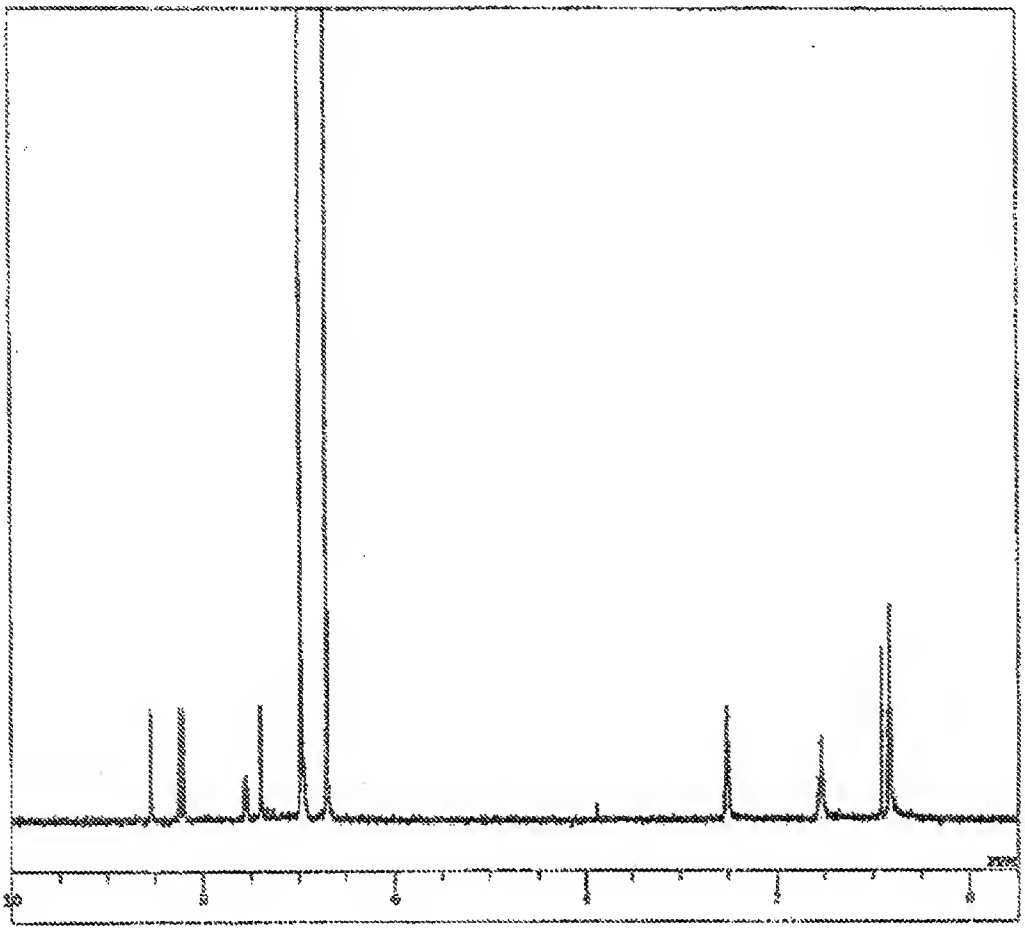


Figure 4

The ^{1}H NMR spectrum of the 2,3-di(n-plopyl) pentacene after the solution was heated for two hours.

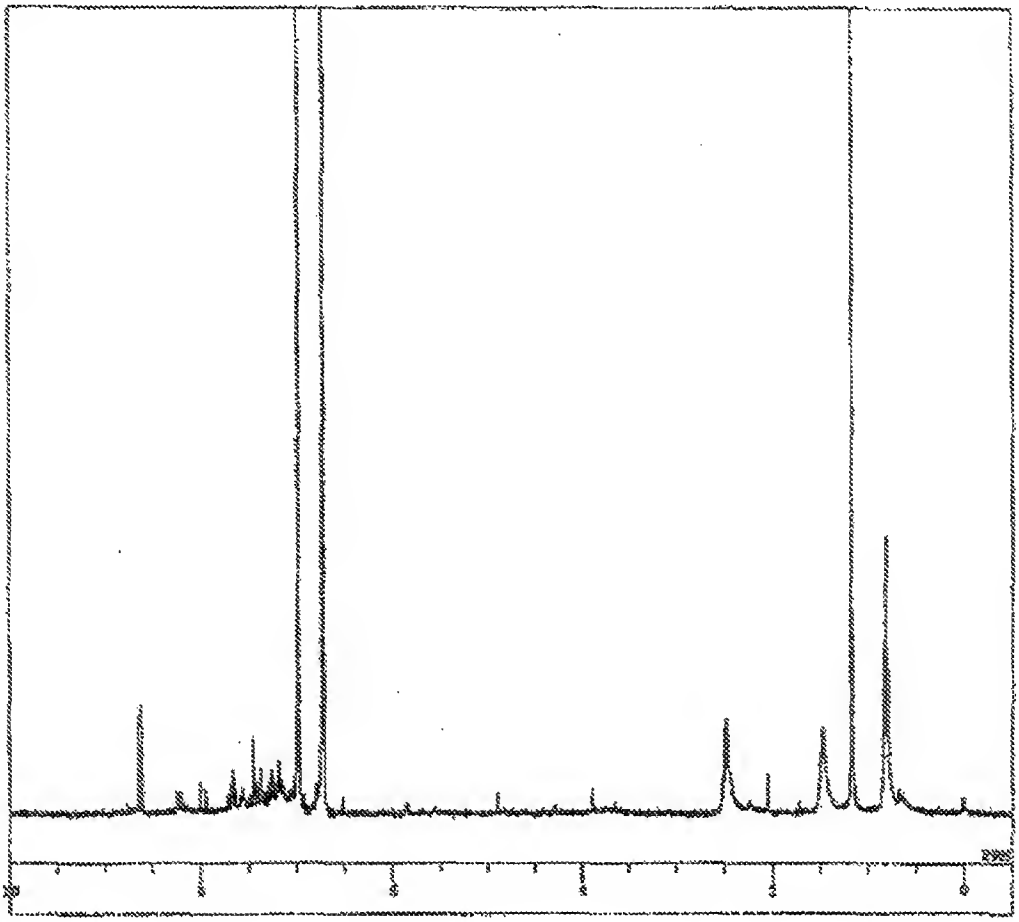


Figure 5

Top Line: The ^{1}H NMR spectrum of the 6,13-dichloro-2,3-di(n-plopyl) pentacene immediately after the solution was prepared (same spectrum as shown in FIG. 1).

Middle Line: The ^{1}H NMR spectrum of the 6,13-dichloro-2,3-di(n-plopyl) pentacene after the solution was heated for two hours (same spectrum as shown in FIG. 2).

Bottom Line: The ^{1}H NMR spectrum of the 2, 3-di(n-plopyl)-6,13-pentacene quinone.

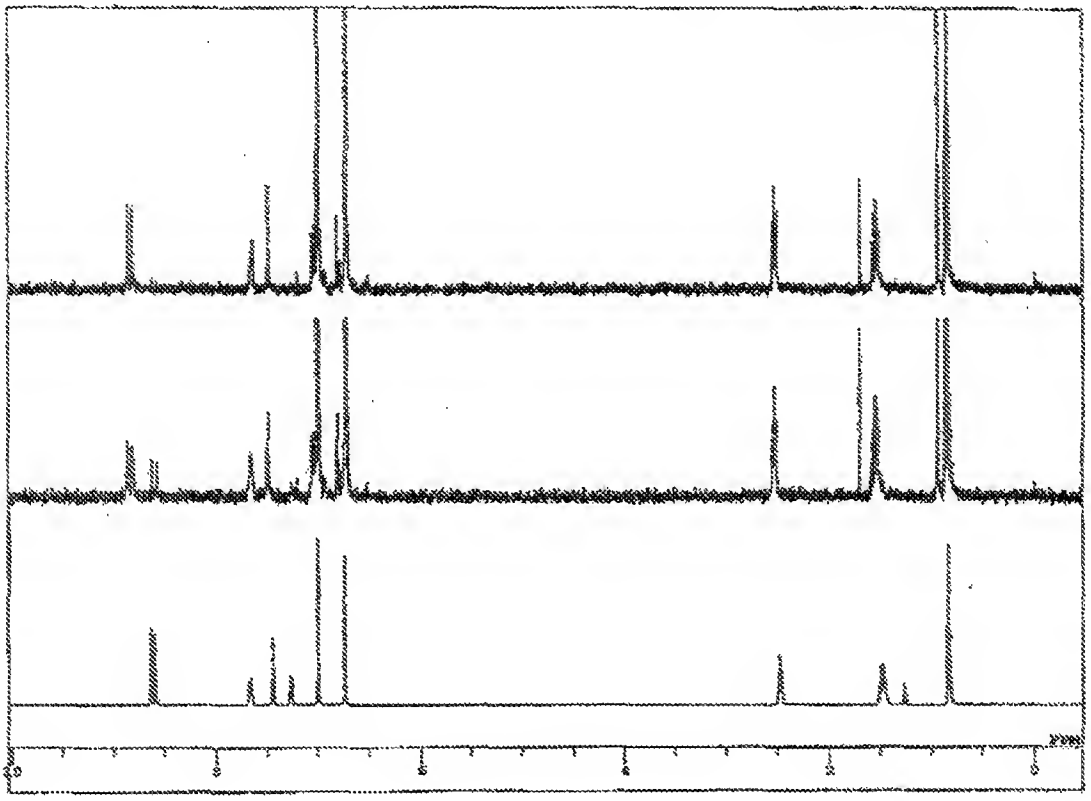
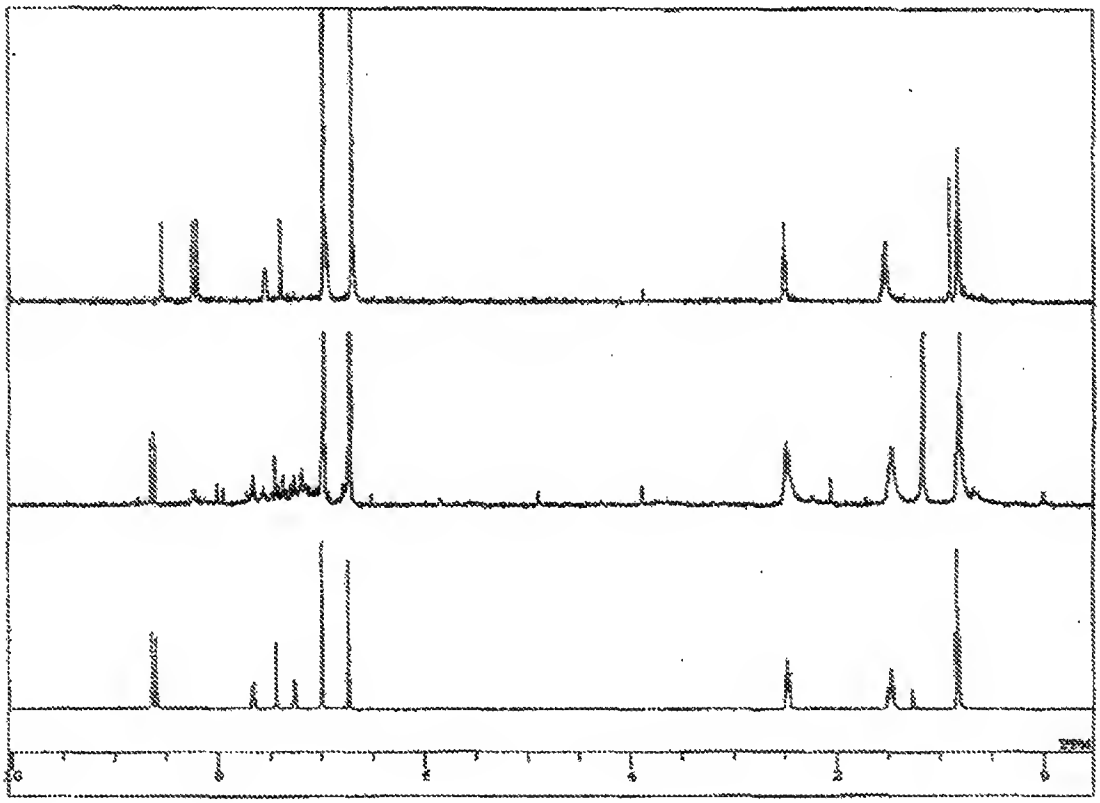


Figure 6

Top Line: The ^{1}H NMR spectrum of the 2,3-di(n-plopyl) pentacene immediately after the solution was prepared (same spectrum as shown in FIG. 3).

Middle Line: The ^{1}H NMR spectrum of the 2,3-di(n-plopyl) pentacene after the solution was heated for two hours (same spectrum as shown in FIG. 4).

Bottom Line: The ^{1}H NMR spectrum of the 2,3-di(n-plopyl) - 6,13-pentacene quinone.



The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S. Code 1001 and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

By: Kazuto Nagata Date: May 12, 2010